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ANNUAL
REPORT

ALBERTA TREE NURSERY AND HORTICULTURE CENTRE

Alberta
AGRICULTURE

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CONTENTS:

DIRECTOR'S REPORT 1

HORTICULTURE CROP DEVELOPMENT

Seed Potato Program 3
Horticulture Extension 8
Micropropagation Pathology 12
Vegetable Program 14

PROTECTED CROP DEVELOPMENT

Greenhouse Program - Commodity Report 20
Greenhouse Extension Research 20
Greenhouse Investigations 21
Studies of Fungus Pythium 25
Micropropagation 25

NURSERY CROP DEVELOPMENT

Commodity Report 27
Shelterbelt Program 28
Small & Large Container Program 30
Seed Collection & Extraction 31
Grounds, Arboretum & Special Plantings 33
Chemicals 33
Woody Plant Research 33
Meteorological Report 35

FARM SERVICES 39

SUMMARY OF RESEARCH PROJECTS 40

THE CENTRE IN PHOTOS 45

ATN&HC STAFF - 1988 49

DIRECTOR'S REPORT - George Grainger

This past year has been an extremely busy one with ongoing program changes, added responsibilities and industry development. All in all, it was a positive year with continued development at the Centre of industry based programs. Generally, 1988 saw a steady year in the horticulture industry in northern Alberta. Climate, as always, played a key role in field horticulture. The heat wave in May/June caused some rapid maturing in some crops. The weather also caused serious greenhouse tomato crop losses in May and June. Rural woody plant material was affected by heat, a consequent increase in ash bark beetle has become a serious threat to nursery operators in southern Alberta. The seed potato growers were not affected to any great extent by the heat wave.

The move of the seed potato program to the Centre was an excellent addition to our developing a micropropagation centre. The move did not cause any serious adjustments and went smoothly. Some staff and facility reorganization was needed and accepted by all. The program was to increase nuclear seed potato production. The addition of the micropropagation pathologist improved our ability to maintain disease free stocks in the micropropagation process. Several identifications were made and recommendation for control or management will be forthcoming.

There was a greater than normal demand for horticulture production information showing the determination of farmers in Alberta to diversify in order to stabilize their income. A great deal of interest was shown in greenhouse, Christmas tree and field vegetable specialty crop production.

A dramatic reduction in demand for trees for 1988 spring shipping was caused by the fee implementation. This reduction was short lived however, as the demand for 1989 shipping is up some 40%.

The Centre has increased its research role on the established crops grown in northern Alberta as well as increasing its role on researching new and developing crops. There has been an increased need to test certain products including involvement with the Agriculture Research Institute on a major project from a Japanese concern; the testing of Pi (¶) water was conducted in November. Other products tested included Nitrozyme, Biosal, Biomed and alfalfa pellets. Results from some were not encouraging while others had definite possibilities for crop enhancement. Results are not printed in the Annual Report.

Budget constraints and reallocation in 1988 resulted in a lessening of emphasis on some projects and programs. Urban horticulture and the Provincial Parks Program received less emphasis in 1988. Although both are being reduced they are being maintained.

1988 was a building and reorganization year. One of the major administrative projects was the committing of a development strategy for the Centre; certainly a challenging process. It is intended for completion in early 1989.

HORTICULTURE CROP DEVELOPMENT

The Horticulture Crop Development Section is comprised of the Seed Potato, Vegetable, Horticulture Extension and Micropropagation Pathology programs. This section has four professional, one technical and one information officer. Seasonal staff are hired as required during peak work periods.

Seed Potato Program - Jim Letal

The Seed Potato Industry consists of 31 growers who produce 1,644 hectares of seed potatoes. In 1988, 46,057 tonnes of seed potatoes were produced. Figures on the import sales of the 1988 crop will not be available until the late spring of this year when sales are completed. In 1987, 14,288.68 tonnes were exported to the United States. Of these 76% went to Washington, 18% to Oregon and 6% to Idaho.

By variety, exports were -

Russet Burbank	- 78%
Shepody	- 14%
Norchip	- 4%
Atlantic	- 3%
other	- 1%

The export sales of seed potatoes have steadily increased since 1976 when Alberta Agriculture started pursuing this market (see table 1).

Table 1. Production and export figures for 1976 - 1988.

Crop Year	No. of Seed Growers	Seed Area (Hectares)	Production (Tonnes)	Exports (Tonnes)
1976	18	222	4,636	0
1977	16	512	6 909	78
1978	13	561	9,955	210
1979	14	466	10,455	414
1980	15	483	13,455	3,258
1981	19	593	13,273	3,630
1982	18	739	14,136	4,249
1983	23	971	21,818	6,228
1984	33	1,295	22,500	9,514
1985	37	1,675	30,310	10,488
1986	37	1,792	36,838	11,258
1987	35	1,619	45,000	14,289
1988	31	1,644	46,057	-- *

* Note: No figure presently available because exports of the 1988 crop will occur in the spring of 1989.

On April 1, 1988, the Seed Potato Program, which had been operating out of Olds since 1978, was transferred to the Alberta Tree Nursery and Horticulture Centre (ATN&HC), Edmonton. The main reason for this move was to take advantage of additional greenhouse space and staff available at the ATN&HC to allow for expansion of seed potato production. This move resulted in a few difficulties, such as delayed greenhouse production. However, in general the move went very smoothly.

The tissue culturing responsibilities were assigned to Kris Pruski and the greenhouse production portion was assigned to Cecilia McIsaac. Overall, program supervision, research, extension and field production of elite seed potatoes remained with Jim Letal. In addition, Piara

Bains, a micropropagation pathologist, was hired to test seed potatoes and other micropropagated crops for pathogens.

Elite I Seed Production:

The Seed Potato Growers Association requested that Alberta Agriculture produce Elite I seed of a few cultivars for one year only to allow for an increase in volume of seed so that it would be financially feasible for a seed potato grower to clean up his operation and start with clean seed. This was done and, as a result, 81.9 tonnes of Elite I seed was produced and is available for a grower to plant in 1989 (see table 2). This seed will be planted by Case Spelt, a seed grower near Bentley, Alberta.

Pre-Elite and Nuclear Seed Production:

Field growing of pre-elite seed resulted in production of 93,685 tubers that will be sold to seed growers in the spring of 1989. This production will continue in 1989. Sale price is 50¢ per tuber.

Also, this year we produced 44,240 nuclear greenhouse tubers. Most of these will be planted in our fields in 1989 to produce pre-elite seed potatoes.

Seed Sales:

In 1988, 66,125 tubers were sold. In 1989 we have, and can fill, orders for 90,680 tubers. An additional 20,000 tubers of Norchip, Shepody and Atlantic were ordered, however, due to insufficient production we are unable to fill these orders.

Grower Production of Nuclear Seed Potato:

This year for the first time we have grower interest in producing their own nuclear seed potatoes. Time was spent with growers and Agriculture Canada discussing the feasibility of this type of change. We will continue in encouraging growers to move in this direction.

Table 2. Elite Seed Potato Production.

	Nuclear (tubers)	Pre-Elite (tubers)	Elite I (tonnes)
A69868-2	18	60	-
Atlantic	1000	350	-
Banana	173	-	-
Butoche	44	-	-
Bintje	100	-	-
Carlton	50	900	-
Cheroke	10	-	-
Conestoga	2,538	2,000	-
F76080	38	-	-
Jemseg	40	-	-
Kennebec	20	900	-
Min 9632	500	-	-
Monora	1,200	-	-
Norchip	2,000	4,700	4.0
Norgold Russet	50	2,400	4.0
Norland	1,000	3,300	-
Red Pontiac	10	375	-
Russet Burbank	30,000	60,000	50.0
Russet Norkotah	2,000	11,000	-
Sangre	3,000	3,000	18.0
Shepody	2,000	1,700	0.4
Superior	500	2,100	3.0
Viking	49	-	-
Warba	100	375	-
Wisc 848	400	-	-
Yukon Gold	400	525	2.5
Totals:	44,240	93,685	81.9

Nicaraguan Trainee:

Stern Robinson from Estele, Nicaragua spent 2 months being trained in seed potato production and tissue culturing techniques. Funding for this work came from Olds College through a CIDA project. Mr. Robinson has since returned to Nicaragua where he is setting up an elite seed potato production program.

Extension:

Extension programs were provided for growers by on-farm visits and presentations at grower meetings. Support is ongoing in assisting the Seed Potato Growers with marketing in the Pacific/Northwest.

Horticulture Extension - Betty Vladicka

This section provides information to producers, retailers and utilizers of horticultural products. The philosophy of the section is that by encouraging the proper utilization of horticultural plants and the safe use of horticultural products, and increasing the utilization of ornamentals and vegetables, the industry will continue to grow.

Extension Activities:

Activities of the staff were focussed in several areas. Between late January and mid-April, 23 regional, full day courses were offered to rural Albertans through the district offices of Field Services. The most popular topics were landscaping the home grounds, yard maintenance, pruning, pest control in the home yard and vegetable gardening. Several presentations were given at farm women's conferences, Alberta Women's Week and meetings of horticultural societies and service clubs.

The number of demonstration gardens increased in 1988. In addition to the expanded horticultural section in the Crops of Alberta demonstration area, six gardens were planted in region 3. This project, conducted in co-operation with the district home economists, demonstrated newer vegetable cultivars, and techniques for improving quality and yield. Staff participated in the garden tours/field days that were held at each site. Materials and information were also supplied to several other district offices who planted demonstration gardens in conjunction with local agricultural service boards.

During 1988 the retail garden centre industry experienced a slight growth. Studies in the United States indicate that 78 percent of America's households garden and that the most fervert converts are between the ages of 30 and 49. These changes have the greatest impact on the ornamentals industry.

Staff at the garden centres must handle a wide range of questions. To assist them in satisfying the consumers, Horticulture Extension

conducted a diagnostic workshop for the retail operators group of LANTA. A presentation on insect pests and diseases was also given to the Red Deer chapter of LANTA.

The Parks departments and many of the urban municipalities also provide a horticulture information service for the home owner. This section produced a newsletter, Horticulture Extension Notes (HEN), aimed specifically at this group of horticulturists. An annual workshop was also conducted for these individuals. The workshop in 1988 focussed on soil problems. A grant program administered by this office provides funds to the municipalities to help in offsetting the operational costs of providing the information service.

Horticulture extension provides information directly to the general public through a variety of methods. In addition to the telephone inquiries and the hortline, a very basic diagnostic service was provided. For 1988 statistics, see table 3.

The mass media channels were used whenever possible. Staff utilized the department's Call of the Land and Agri-News. Interviews with several local radio and television stations were given throughout the year. Articles were also written for several local magazines and a daily paper.

Liaison Activities:

In addition to the extension functions, Horticulture Extension serves as a liaison between ATN&HC and associations, institutions and agencies involved with home gardening. The extension horticulturist is an ex-officio director of the Alberta Horticultural Association and sits on many of their committees. She also serves as the co-ordinater of their education program and editor of their newsletter, the Alberta Horticulturist.

This office continued to support the Association in its operation and hosting major events such as the convention and the provincial show. The horticulturist was instrumental in having the Board of Directors participate in a strategic planning workshop. As a result, the Association is reviewing all its programs.

Since becoming Vice President of the Board of Trustees of the Friends of the University of Alberta Devonian Botanic Garden, the horticulturist has become more involved with the operation of the Friends and the Garden. Several major projects that are underway include the construction of the Kurimoto Japanese Garden, formulation of a long range plan for the Garden, and the restructuring of the board of trustees.

The extension horticulturist also served as the convention chairman for the Western Canadian Society for Horticulture. At the annual meeting she was elected vice president and appointed chairman of an adhoc committee on restructuring the society.

Research Activities:

The use of alfalfa pellets as a source of nitrogen for home lawn - Betty Vladicka, Maureen Olesky.

Commercially available alfalfa pellets were used as a top dressing on a stand of Kentucky bluegrass and creeping red fescue. This trial involved two treatments of 21-0-0 at different rates, five treatments of pellets at different rates and a control.

The alfalfa plots were very slow to green up and never did acquire a deep blue color. The breakdown of the pellets was extremely slow giving the turf an unsightly appearance. It was concluded that alfalfa pellets would not be a suitable source of nitrogen for home lawns.

Table 3. Statistics.

Month	Telephone Inquiries	Hortline	Soil Reports	Publications	Office Visits	Plant Samples
January	125	237	2	750	2	-
February	205	326	67	3,000	2	-
March	340	302*	19	8,825	3	1
April	650	495	51	28,640	5	3
May	1,120	653	72	11,710	24	25
June	920	426	20	810	27	43
July	525	460	40	1,225	32	34
August	870	340	34	2,825	33	48
September	570	334	60	610	10	12
October	380	210	44	1,435	7	8
November	135	163	66	920	4	1
December	75	131	19	280	2	2
Total	5,915	4,077	494	61,030	151	177

Micropropagation Pathology - Piara Bains

Micropropagation pathology is a new program. It was initiated when the seed potato program was transferred to ATN&HC. Responsibilities include testing micropropagated crops including seed potatoes for pathogens and conducting applied research programs on plant diseases as related to crop production.

Research projects recently initiated include studies on stem canker and black scurf on potatoes caused by Rhizoctonia solani. The disease causes financial losses to potato growers by reducing yields and by inducing the production of deformed and black scurfed potatoes. Seed potato growers experience further losses due to down grading of seed potatoes. The objectives of this project are (1) to determine anastomosis group affinity of R. solani isolates from Alberta potatoes, (2) to evaluate the effects of selected fungicides on R. solani in vitro and on the development of Rhizoctonia disease of potato in the greenhouse and/or in the field, and (3) to isolate and test indigenous microbial antagonists and hyperparasites of potato isolates of R. solani in the laboratory, in the greenhouse and/or in the field.

During July and August 1988, 65 isolates of R. solani were collected from potatoes growing in central and southern Alberta. A study of cultural characteristics indicated that there is wide variation amongst isolates. Determination of their anastomosis group affinity and relative pathogenicity is in progress. It is expected that the results of this investigation will contribute towards better understanding of the disease and help devise suitable control measures.

In another study, two fungi were found colonizing saskatoon roots. Identification of these fungi and the importance of their association with saskatoon roots is under investigation.

Micropropagation pathology program also ensures that micropropagated plants are disease free. At present, seed potatoes and saskatoons form the bulk of micropropagated plants at ATN&HC. A disease free nuclear

plant bank of 27 cultivars of potatoes is maintained for *in vitro* and greenhouse multiplication. *In vitro* and greenhouse grown plants are indexed for potato spindle tuber viroid, and various viral, bacterial and fungal diseases.

A total of 26,000 potato plants from the nuclear plant bank, greenhouse and field were tested for PVS and PVX. Out of these, 300 plants belonging to the nuclear plant bank were also tested for PLRV, PSTV, bacteria and fungi. The results of the ELISA test indicated that the plants were free from these viruses. A similar system of indexing diseases and maintaining disease free stocks is being developed for saskatoons.

Vegetable Program - Belinda Choban

The Vegetable Program at ATN&HC provides extension and research support programs for commercial vegetable and market garden growers in central and northern Alberta.

Trends for 1988 were: increased use of transplants for cole crop production compared to direct seeding, more growers produced their own transplants, and several crops were reseeded due to dry spring conditions.

The season started out very dry but, in spite of this, vegetable quantity and quality was very good. Prices were strong throughout the season resulting in good returns to the producer.

Due to the drought conditions, more growers utilized assistance from the (Provincial/Federal) Water Development Program. Insect populations (particularly flea beetles, root maggots and cabbage worm) were higher than usual.

Marketing at the farm gate, through farmers markets and wholesale outlets was very successful. Some problems with grading and packaging were encountered. Edmonton wholesalers purchased up to 70 percent of of their fresh produce from vegetable growers in the area. Sun-fresh Farms Co-op, assisted by Alberta Agriculture, continued to successfully market local produce.

The Alberta Market Gardeners Association continued to grow. They were actively involved with promotions, courses and other aspects of the horticulture industry.

The Alberta Fresh Vegetable Marketing Board is reviewing its mandate and policies. They were successful in controlling vegetable prices.

Extension:

Production and marketing information was extended to market garden and commercial vegetable growers in central and northern Alberta. Support was provided for the expansion of the fresh vegetable industry.

Extension information was provided by farm visits, telephone calls and by means of a monthly newsletter "Alberta Produce Notes". Growers were encouraged to make office visits at ATN&HC. In addition, a number of tours, courses and seminars were organized and presented to various industry groups.

Contacts were maintained with other government agencies, grower organizations, wholesalers, and grower service companies and organizations.

The Vegetable Specialist was actively involved with the Second Annual Alberta Horticultural Congress and the Vegetable Fall Harvest Festival. Assistance was provided to the Cancer Society, Fresh for Flavor and the Vegetable Industry in promoting the use of Alberta fresh vegetables.

The Vegetable Specialist also interpreted soil analysis reports and provided fertilizer recommendations to vegetable growers. On-farm demonstrations of specialized equipment was carried out.

Some co-operative projects included working with Alberta Hail and Crop insurance to establish crop insurance rates for vegetable crops, working with the Alberta Agricultural Engineering Department in designing and building a more efficient vegetable washer, and also worked with PIMA Innovations from Regina, Saskatchewan in attempting to establish local manufacturers for specialized vegetable equipment.

Research:

Cultivar Trial -

Early cabbage transplants at Edmonton:
Cultivars tested were Wanda, Prospera, Polar Green, Stokes Viking Golden Acre, Tastie, Duncan, Quickstep, Solid Blue Brand, Castello and Red Rook. Wanda and Polar Green performed the best, having early sizing, round, firm heads and low thrip damage. Wanda had high resistance to spliting, a smaller core and very little thrip damage.

Storage Cabbage Transplants:
Cultivars tested were Stonar, Quick Green Storage, April Green, Brutus, and Langedijker Winter (red). All cultivars had high yields and good head weight. Samples from all were placed in storage to determine keeping quality. After six months in storage, Brutus and Langedijker Winter (red) maintained a high quality.

Storage Cabbage Transplant at Fairview:
The storage cabbage transplant trial was repeated at Fairview in the Peace River Valley. Samples were placed in storage to determine keeping quality.

Broccoli Transplants:
Cultivars tested were Brigadier, Chancellor, Gallaxy, Green Sure, Premium Crop, Saga, Vantage and Venice. The earliest, high quality variety was Galaxy, however, some inter-leaving and color-mottling did occur. Premium Crop and Brigadier rated the highest, having high yields and performance, nice, uniform dark green color and large heads. Brigadier maintained quality in storage longer than Premium Crop.

Cauliflower Transplants:
Cultivars tested were Alpha-Balanza, Andes, Cloud Nine, Glacier, Goodman, Olga, Solide, Solo Crop, Starbrite, Torina, White Bishop, White Fox and White Rock. The old favorites, White Fox, White Rock and Andes,

performed very well in curd quality and earliness. However, two new varieties, Solide and Starbrite, were very promising and performed slightly better than the old favorites.

Brussel Sprout Transplants:
Cultivars Boxer, Dolmic, Fighter, Golfer, Oliver and Valiant were tested. Oliver still did the best; having high yields, early development and good sizing. Boxer looked very promising and displayed high quality.

Snow Peas:
Little Sweetie, Ho Lohn Dow, Oregon Sugar Pod and Mammoth Melting Sugar were tested. Little Sweetie achieved a high level of production 10 days before the other cultivars. Ho Lohn Dow ceased production earliest but had the highest average yield.

Potato Cultivar Trial:
Ten cultivars were grown for a demonstration purposes only.

Chinese Vegetables:
Eighteen different Chinese vegetables were grown as a demonstration in an attempt to establish a local market for alternative and specialty crops. The Chinese vegetables that matured and showed a market potential were White flowered kale (also known as Chinese Broccoli), Yellow flowered kale, garland Mum, Joi Choi and Chinese lettuce. All these Chinese vegetables were harvested several times starting in mid-June and ending in mid-July. Summer heat and long hours of sunlight caused many plants to bolt.

Cultural Trial -

Carrots - Raised Beds Verses Flat Beds:
Special Nantes 616 was seeded into flat and raised seed beds. Germination was considerably higher in the raised beds resulting in plant competition and poorer root quality. The carrots in raised beds

also grew quicker, reached maturity earlier and were easier to harvest than those in flat beds.

Cos (Romaine) Lettuce Spacing Trial:
Three in-row spacings of 15, 20 and 30 cm were evaluated using Green Tower, Valmaine, Parris Island and Signal Cultivars. The 15 cm spacing produced the highest yields and best quality in all varieties. Green Tower produced the best quality closed head. Signal produced the second best head.

Cos (Romaine) Lettuce Succession Seeding:
Parris Island was seeded consecutively every 10 days starting April 11 and ending October 24. Harvest started on June 27 for the earlier seeding dates. Quality was good in all crops planted prior to and including May 12. Later planting dates up to July 11 produced plants that were unmarketable - plant quality was poor and bolting was high. Seeding dates after July 11 produced plants that were marketable but yields were low and quality was variable. Seeds planted after September 1 did not germinate. These will be monitored in the spring of 1989.

Head Lettuce Succession Seeding:
Premier Great Lakes was seeded consecutively every 10 days starting April 11 and ending October 24. Good plant vigor and yields were obtained from planting dates between April 21 and May 21. Earlier planting dates resulted in poor germination; later planting dates followed the same pattern as the Cos Lettuce succession seeding Trial.

Spinach Succession Seeding:
Melody, Wobli and Cold Resistant Savoy were seeded consecutively every 10 days starting April 11 and ending October 24. The early seeding dates of April 11 and April 21 had poor germination and plant quality and they took longer to mature. Good plant vigor, maturity and yields were obtained from planting dates between May 2 and May 20. Later planting dates followed the same pattern as the Cos Lettuce succession

seeding trial. Melody performaned the best and Wobli was very resistant to bolting.

Soil Amendments with Alfalfa Pellets:

Alfalfa pellets were used as an organic source of nitrogen for cabbage, lettuce and peas. It's effects on the soil organic matter contents when used as an organic fertilizer were also observed.

There was no significant effect on the yield or quality of the vegetables, nor any increase in organic matter content of the soil.

Greenhouse Program - Commodity Report - Mirza Mohyuddin

Nineteen eighty-eight was a good year for the Alberta Greenhouse Industry. The vegetable sector performed satisfactorily. Seedless cucumber prices were below that of 1987. Both Red-Hat and Sunfresh Co-ops had difficulty selling cucumbers in July and August. The average returns were between \$40 - 50/m^2 in the province. The top growers earned a revenue of \$80/m^2. Tomato prices were stable but serious crop losses occurred due to a heatwave in May and June. Lettuce production was stable.

Bedding plant and ornamental growers had a good year. The sales were excellent, only a few growers reported an excess of geraniums. Poinsettia crops were very good; sale prices were similar to those in 1987. Easter lily crops were also good and produced on time.

The Alberta Greenhouse Grower's Association continued to progress well during 1988. For the first time the Alberta region of Flowers Canada joined under the umbrella of Alberta Horticulture Congress. The Alberta Horticulture Congress had an outstanding convention in Edmonton.

Alberta Agriculture continued to provide extensive back up to greenhouse growers. Alberta Agriculture's Soil and Animal Nutrition Laboratory continued to provide soil and water analysis on a priority basis.

Greenhouse Extension Research:

1988 was a busy year for the greenhouse program at the Alberta Tree Nursery and Horticulture Centre. At Alberta Special Crops and Horticultural Research Center in Brooks, the new greenhouse specialist, Judy Butt, commenced her new position in May. Prior to this date, the

specialist at ATN&HC provided service to the growers throughout Alberta, including southern Alberta.

The major activity was regular visits to growers or special visits when a problem occurred. This mode of extension was found most useful in terms of technology transfer. Another important mode of extension was subject workshops. Eight workshops were held throughout the province. Subject areas included cucumber, bedding plant, interior landscape, poinsettia and hydroponic culture. Attendance ranged from 30 to 50 growers.

The Hobby Greenhouse publication was revised and is expected to be printed in July 1989. A greenhouse vegetable production guide, including information on seedless cucumbers, tomatoes and peppers was prepared.

Dr. Mirza Mohyuddin was invited to be a guest speaker at the Manitoba Greenhouse Growers' Association Conference in November and presented two talks related to greenhouse production. The American Greenhouse Vegetable Growers' Association Meeting in Orlando, Florida was also attended.

Involvement with the Alberta Greenhouse Growers Association continued to grow. All board meetings were attended. Assistance was provided in the organizing the Annual Congress. Two talks were presented at the Congress.

Greenhouse information was provided for about 175 people who were interested in starting a greenhouse business.

Greenhouse Investigations - **Mirza Mohyuddin, Kris Pruski and Muhammad Younus**

A modest greenhouse demonstration/research program was maintained. Growers were encouraged to visit and obtain first hand knowledge of crop management.

1. Use of Potassium silicate in hydroponic systems to reduce root decay problems.

This was a continuation of experiments to develop practical guidelines for growers on the use of Potassium silicate. Two experiments were carried out with seedless cucumbers in a NFT hydroponic system. Potassium silicate was added at 50 ppm in the recirculating nutrient tanks. There were 50% more white active roots in treated than in the control plants. In one experiment, the fungus Pythium was added to nutrient tanks with and without Potassium silicate and root health was observed after 6 weeks. The roots without Potassium silicate were totally brown within 6 weeks and plants started wilting. The roots in the NFT system treated with Potassium silicate and Pythium were approximately 50% white and 50% brown. The roots in the control tank (no Pythium and no Potassium silicate) were 100% white and healthy. Plant health was better in crops getting 50 ppm of Potassium silicate on a weekly basis.

2. Seedless cucumber cultivar trial.

Cultivars Mustang, PSR 63585, Farona and Cargo were seeded on March 4, 1988 in 10 cm rockwool cubes and placed into NFT grow channels on April 5 at a spacing of 1.25 plants/m^2. The system and nutrient management is reported in 1986 and 1987 Annual Reports. The crop harvest began on April 29 and was terminated on June 28. Cultivar Mustang yielded 36.0 kg/m^2, followed by Cargo at 33.0 kg; PSR 63585 at 30.8 and Farona at 29.2 kg/m^2. Cargo was better in terms of number of fruit at 83.75/m^2, followed by Mustang at 78.7 fruit/m^2.

3. Seedless cucumber spacing trial.

Cultivars Mustang, Farona and Corona were seeded in a 10 cm rockwool block on June 29, then placed into NFT growing channels on July 15 at spacings of 0.8 m^2, 0.6 m^2 and 0.4 m^2/plant. The harvest began on August 18 and crop terminated on September 26. The data is given in table 4.

Table 4.

Cultivar	0.8 m^2		0.6 m^2		0.4 m^2	
	Cucs/plant	kg/m^2	Cucs/plant	kg/m^2	Cucs/plant	kg/m^2
Mustang	33.5	41.8	27.0	43.2	19.2	48.0
Farona	28.5	35.6	24.8	39.7	18.0	45.0
Corona	29.0	36.2	22.2	35.5	21.8	54.5

Corona yielded best under high density conditions.

4. Tomato cultivar trial.

Cultivars Sonatine, Caruso, Laura and B-83-977 were seeded in 10 cm rockwool blocks on January 18 and transferred to NFT growing channels on February 15. Harvest began on April 25 and the crop was removed on June 30. The plant density was 2.5 plants/m^2. Yield data is summarized in table 5.

Table 5.

Cultivar	kg/plant	kg/m^2	Average Fruit Weight (g)	kg/cluster
Sonatine	8.20	20.5	78.4	0.52
Caruso	8.23	20.6	180.3	0.85
Laura	8.44	21.1	189.0	0.88
B-83-977	8.82	22.05	181.5	0.85

The yield performance of B-83-977 (De Ruiter Seed Co.) was superior to other cultivars.

Another trial, comparing cultivar B-83-977 and Caruso was conducted in the fall. Seeding was done on June 28 and plants transferred to grow channels on July 20. First harvest took place on September 26 and the crop was removed on November 7. The cultivar B-83-977 yielded 4.0 kg/m^2, while cultivar Caruso yielded 3.5 kg/m^2. A record of fertilizer usage showed the following pattern:

Nutrient Use Per Plant:

Nitrogen	31.6 g	Manganese	0.09 mg
Phosphorus	8.5 g	Boron	0.013 mg
Potassium	54.7 g	Zinc	0.007 mg
Calcium	21.5 g	Copper	0.0004 mg
Magnesium	5.4 g	Molybdenum	0.0001 mg
Iron	2.09 mg		

5. Alstromeria cultivar evaluation.

Cultivars Veronique, Vanitas and Jaqueline were planted in benches containing a peat:vermiculite medium on December 31, 1987. Cultivar Veronique had difficulty becoming established and, consequently first harvest began in August, 1988. Cultivar Vanitas started flowering in February and continued until September. There were 10 plants/m^2. Vanitas yielded 350 flower/m^2, Jaqueline yielded 198 flowers/m^2, while Veronique yielded 36 flowers/m^2.

These plants were grown at much warmer temperatures than ideal because of their proximity to cucumbers and tomatoes.

Studies on the Development of Fungus Pythium in Nutrient Film Hydroponic System - Kan-Fa Chang and Mirza Mohyuddin

A small research project was initiated to study the development of the fungus Pythium in NFT systems. Several isolations were made from crops obtained from commercial growers. It was found that Pythium was associated with roots at very early stages of development. Techniques for isolation from roots and water were standardized. A bacterium was isolated from NFT grown cucumber crops which demonstrated a strong antagnostic effect to Pythium. Further research on the development of this fungus is planned.

Micropropagation - Kris Pruski, Muhammad Younus and Mirza Mohyuddin

The tissue culture lab continued to provide a good service and support to the industry. Approximately 8,000 rooted saskatoon plants were produced and provided to various groups inside and outside the province. One hundred and five rooted plants were sent to a Botanical Garden in Belgium. New cultivars for 1989 have successfully been established, including 4 new selections from Beaverlodge and 1 from Len Pearson's orchard.

A major increase in the quantity of micropropagation occurred when the the seed potato program moved to ATN&HC. A total of 40,000 plants were produced from April to October, 1988. New cultivars for 1989 are being established.

A sour cherry selection from the University of Alberta was micropropagated and 100 plants were produced. They were planted in 3 locations (ATN&HC, Grande Prairie and Brooks) for observation. Another sour cherry selection from Poland, Lutowka, is being evaluated for its hardiness in Alberta. Cultures of 6 clones have successfully been established and are in the multiplication stage. One thousand trees will be produced in the spring of 1989 for hardiness trials throughout Alberta.

Cultures of Linden, Green ash and Purple leaf birch are being established for multiplication. These were selected from superior performance trials in the province. Cultures of Fern leaf peonies were established in November. Experiments with ivy geraniums are in progress, however, difficulties with rooting have been experienced.

NURSERY CROP DEVELOPMENT

Commodity Report - Brendan Casement

The Nursery and Landscape Industries had a good year with most businesses experiencing some growth. Nursery stocks were in good supply.

Landscape plant material in southern Alberta were affected by the drought, especially in rural areas. This made the plant material more subject to infestations of insects and diseases. The ash bark beetle, an insect that is reported to only attack trees under stress, became a serious problem in central southern Alberta. There are no recommended insecticides for this pest.

Members of the Landscape Alberta Nursery Trades Association (LANTA) formed an Alberta Landscape Horticulture Research Task Force to better assess the needs of the ornamental industry. Membership was drawn from LANTA, prominent horticulturists, and the Directors and ornamental researchers at the Alberta Tree Nursery and Horticulture Centre and the Alberta Special Crops and Horticultural Research Center. This committee was to develop a proposal for promotion of superior plant material and to provide guidelines for a permanent research committee.

Nursery Extension:

Four issues of 'Alberta Nursery Notes' were produced, and distributed to Nurserymen, District Agriculturists, Agricultural Fieldmen and others. Information was provided to about 100 people interested in starting nurseries and a further 20 people wanting information on Christmas Tree farming.

Short courses were presented on Judging Yards and Gardens, and Pruning. Judging Yards and Gardens was presented at two locations, Fairview and Olds College. The two day pruning courses were given at the ATN&HC and

4 one day courses at other locations. Seventy-four people attended the pruning course at ATN&HC.

Presentations on trees and shrubs were given to the Western Canadian Cemeteries Association annual meeting, Alberta Horticultural Association annual meeting and the Prairie Turfgrass Conference.

Brian Breneman and Brendan Casement attended the Great Plains Agricultural Council Forestry Committee meeting in Regina, which dealt with the reduction of soil erosion by shelterbelts. This meeting was attended by most researchers working on shelterbelts in Canada and the United States, and by many production supervisors of shelterbelt nurseries.

Brendan Casement attended a meeting of the Prairie Regional Trial for Woody Ornamentals Committee held in Morden, Manitoba. The ATN&HC replaced the University of Alberta as a Prairie Regional test site.

Shelterbelt Program - Brian Breneman and Rulie Bok

An application fee of $25.00 and a per plant charge of between 12¢ (caragana) and 56¢ (coniferous seedlings) was levied for the 1988 spring distribution. This resulted in a 70% decrease in the number of plants requested as compared to 1987. This did allow for greater flexibility in grading so that the recipients received higher quality plant material. Some assembly errors did occur.

Table 6. Tree Distribution, 1988 Provincial Summary.

Regions	Applications	Tall Deciduous	Small Deciduous	Hedge	Evergreen	* Total
Lethbridge	509	38,925	7,575	84,525	9,290	140,465
Calgary	526	51,750	7,350	113,580	12,635	185,508
Red Deer	512	53,325	4,150	40,750	20,845	119,231
Vermilion	533	46,525	5,225	25,125	19,145	96,191
Barrhead	302	20,495	4,075	18,500	12,340	55,518
Fairview	436	33,525	6,825	25,925	10,805	77,225
Total	2,818	244,545	35,200	308,405	85,060	674,138

*The total includes the 928 Conservation bundles distributed throughout the province.

Production:

The low winter snowfall and dry spring were followed by the wettest June, July and August in the sixteen years of weather records at the ATN&HC. This resulted in some exceptional crop and weed growth.

During the winter, 1.03 million hardwood cuttings of poplars and willows were prepared. These were field planted in 13 working days commencing on May 16. An overall yield, after grading, of 30% was realized. Peach leaf willow yielded only 8% and Northwest and Griffin poplar yields were also low. The cuttings that did root had excellent growth, averaging about two metres by the end of the growing season. Some willows split because of too much growth and were discarded. The cutting beds of Griffin poplar did not recover from the heavy May frost in 1987, giving an unacceptably low yield.

The low emergence of the 1987 fall seeded material was probably due to low moisture in seed beds at critical times in the spring before irrigation was available. During the summer of 1988, 148 kg of green ash, Manitoba maple and caragana seed were seeded into 15 hectares of seedbeds. Nine hectares of land were utilized for the fall seeding of 243 kg of other species. This land had previously been treated with Basamid to kill weed seeds. Rain delayed the transplanting of spruce and pine seedlings during August. Transplanting was not finished until September 8.

Small and Large Container Program - Cecilia McIsaac

The Alberta Tree Nursery and Horticulture Centre, on behalf of the Premier of Alberta and the Minister of Agriculture, sent 5,000 seedlings each of paper birch and green ash to England to help replant the area devastated by a severe storm in October 1987.

Four hundred seedlings, 100 each of Colorado and white spruce and Scotch and lodgepole pine were sent to Guatemala for a research trial.

Ten each of one gallon size trembling aspen and wild rose were sent to Hokkaido, Japan. This was a trial shipment for the 'Alberta Road' project. The main material will be going in 1989.

Small Containers:

Considering the lack of snow cover and warm temperatures during the winter of 1987-1988, a minimal loss of only 6% was achieved on 1,309,904 seedlings that overwintered in lathhouses in small containers.

In 1988, 788,000 seedlings of which 95% was coniferous material were started in small containers.

For Arbor Day, 41,850 colorado spruce and 3,150 lodgepole pine seedlings were distributed throughout Alberta.

The propagation of tissue cultured potatoes in controlled environment was a new experience in 1988. After some teething problems 43,626 seedlings of 27 different varieties were grown and the mini tubers harvested.

Large Containers:

During 1987-88, 117,878 plants in large pots were overwintered. A loss of 9% was realized.

One, two, and five gallon containers of 10,850 plants were shipped to the various provincial parks in Alberta.

Fifty-seven thousand, five hundred eight-seven plants were potted or repotted, 78% of these were native species being potted for the first time.

Seed Collection and Extraction - Doreen Koladich

There were excellent deciduous seed crops in 1988 resulting in a record amount of fruit being harvested for the programs. The most abundant producers were saskatoon, Nanking cherry, chokecherry, Mayday, cherry princepia, Korean bush cherry, green ash, Manitoba maple and Ohio buckeye. Coniferous trees produced lower than average crops, with no production on pines. Some Siberian larch and Colorado spruce cones were collected. Upon extraction the Siberian larch cones were found to have a low percentage (10%) of viable seeds.

Caragana seed was ordered and 192 kg was received from the Scotford and Warburg Hutterite colonies.

The city of Lethbridge staff sent us two bushels of black walnut, ½ bushel of butternut, some basswood and some Ohio buckeye seed.

Bur oak was received from Aubin Nurseries, Carman, Manitoba and ASCHRC, Brooks.

Table 7. Seed Collection Summary, 1988.

Species	Date of Harvest (Day/Month)	Fruit/Cones Picked kg	Yield of Clean Seed kg
Tall deciduous	13/07 - 11/10	388	111
Small deciduous	07/07 - 10/09	1,325	175
Hedge plants	30/06 - 03/11	3,070	253
Coniferous plants	08/09 - 09/11	1,074	20
Total		5,857	559

Table 8. Seed Storage Inventory, December 1988.

Program	Weight (kg)
Shelterbelt	1,187
Provincial Parks	41
Private companies	326
Miscellaneous	27
Total	1,581

Additional fruit was cleaned for the Parks Program (100.8 kg), Gregg River Resources, and for the seed auction at the LANTA Convention.
Twenty-two growers purchased 12.7 kg of seed.
Shelterbelt contract growers received 17.6 kg of seed.

Grounds, Arboretum and Special Plantings - Thean Pheh

Grounds - 2,500 annual flower transplants were planted on the grounds in 1988. The installation of underground power lines required moving some woody and perennial plants. These will be replaced in the spring of 1989.

Arboretum - A bed of edible plants was started in 1988 in the new arboretum. Twelve taxa were added to the pinetum.

Shelterbelts - ponderosa pine, red pine and villosa lilac shelterbelts were established in field 40.

Chemicals - Doug Lehman and Kevin Thorpe

Chemical applications in 1988 were heavier than previous years with additional applications in the greenhouses, vegetable and seed potato programs. Most of the regular spraying of the fields, roadsides and thistle patches were completed. Due to a lower priority, weeds were more advanced than usual. The forest tent caterpillar infestation was at a high level, but was contained with only slight damage to shelterbelt seedlings.

Woody Plant Research - Brendan Casement

Regional Woody Plant Test Program:

An additional seven taxa were added to the trials in 1988, and 238 replacement plants were distributed. All sites were visited and evaluationed. Records were entered into a computer program for easier access. Three plants, Salix alba sericea, Salix alba vitellina and Salix pentandra, were graduated from the trial. The best will be propagated for distribution to cooperating nurseries.

Fertilizer Trial:

The fertilizer trial is a long term trial. It was initiated in 1986 and will be ongoing until 1995.

Nutrient status of soil and leaf tissue was monitored. Fertilizer was applied to the soil to maintain the desired levels of nutrients.

Woody Plant Hardiness Trials:

In 1988, the Alberta Tree Nursery and Horticulture Centre became a test site for two major programs.

The Prairie Regional Trial for Woody Ornamentals is a cooperative trial that was instituted in 1958 under the auspices of the Western Canadian Society for Horticulture. In 30 years of testing in eleven sites on the Prairies there have been about 1,200 entries. The ATN&HC replaces the University of Alberta as a test site.

The Plant Introduction Scheme of the University of British Columbia is a cooperative venture between the University, Landscapers and Nurserymen in British Columbia. Test sites are needed to evaluate the hardiness of the material that is introduced and promoted. The ATN&HC becomes the third site on the Prairies.

Other material is being evaluated, including a numbered rose from Agriculture Canada Research Station at Morden, two poplars from the Shelterbelt Centre at Indian Head, a male cottonwood and a named chokecherry from local nurserymen.

Table 8. Maximum, Minimum and Mean Temperatures at the Alberta Tree Nursery and Horticulture Centre.

Month	Maximum Mean °C	Minimum Mean °C	Mean °C	Extreme High	Extreme Low
January	-8.3	-17.2	-12.8	4.0	-30.0
February	-2.5	-13.4	-8.0	14.5	-34.0
March	7.4	-3.9	1.8	14.0	-12.5
April	13.4	-0.5	6.9	23.5	-9.0
May	20.0	6.1	13.1	30.0	-5.0
June	22.2	10.6	16.4	29.0	4.5
July	22.0	10.9	16.5	31.0	7.0
August	21.5	10.3	15.9	28.5	4.5
September	16.7	5.3	11.0	30.5	-2.0
October	13.0	0.1	6.6	24.0	4.8
November	0.5	-7.9	-3.7	10.5	-18.0
December	-3.2	-11.2	-7.2	9.0	-26.0
Average	10.2	-0.9	4.7	31.0	-34.0

Table 9. Precipitation in 1988.

Month	Rainfall (mm)	Snowfall (cm)	Total (mm)
January	2.0	5.0	7.0
February	--	17.5	17.5
March	--	4.5	4.5
April	15.6	--	15.6
May	21.4	--	21.4
June	167.9	--	167.9
July	150.4	--	150.4
August	108.1	--	108.1
September	44.6	--	44.6
October	4.8	0.2	5.0
November	2.0	5.2	7.2
December	2.8	19.5	22.3
Total	519.6	51.9	571.5

First and last killing frost dates: May 3 and September 25, 1988 had 145 growing days.

Appendix 1. Seed Collection Data - 1988

Species	Collection Dates (Day/Month)	Yield Seed/Fruit
Saskatoon	30/06 - 18/07	38:1
Nanking cherry	07/07 - 29/07	13:1
Mayday	07/07 - 03/08	8:1
Dogwood	08/07 - 26/09	10.5:1
Pincherry	09/07 - 02/08	10:1
Mongolian cherry	12/07 - 25/08	20:1
Honeysuckle	25/07 - 05/08	44:1
Albol currant	05/07 - 25/07	93:1
Chokecherry	08/08 - 17/08	6:1
Cherry princepia	10/08 - 14/11	4.5:1
White birch	11/08 - 19/08	10:1
Silver buffaloberry	12/08 - 24/11	39:1
Sandcherry	15/08 - 15/09	12:1
Korean bush cherry	19/08 - 24/08	8:1
High bush cranberry	29/08 - 01/09	19:1
Villosa lilac	30/08 - 30/09	7.5:1
Scotch rose	30/08 - 26/09	14:1
Ohio buckeye	06/09	3:1
Butternut	06/09	1.3:1
Colorado spruce	08/09 - 09/11	62:1
Siberian larch	09/09 - 21/10	32:1
Common lilac	13/09 - 15/09	28.5:1
Bugnet pine	21/09	266:1
Green ash	22/09 - 05/10	1.5:1
Douglas fir	27/09	110:1
Russian olive	03/10 - 25/10	5.5:1
Sea buckthorne	22/09	5.5:1
Manitoba maple	06/10 - 11/10	2:1
Hedge rose	12/10 - 08/11	9:1
Wild rose	03/11	5:1

Appendix 2. Seed Collection Summary - 1973 - 1988.

	AMOUNT OF COLLECTED FRUIT OR CONES (kg)		YIELD OF CLEAN SEED (kg)	
Year	Deciduous	Coniferous	Deciduous	Coniferous
1973	474	103	54.14	1.40
1974	2,005	1,635	22.39	37.60
1975	682	1,808	55.40	49.05
1976	662	131	188.38	23.98
1977	868	98	203.92	12.78
1978	995	193	257.33	63.50
1979	718	4,091	102.66	69.51
1980	1,573	212	358.00	9.00
1981	1,594	1,835	518.64	9.80
1982	1,596	5,145	175.00	55.00
1983	4,108	1,422	519.00	18.00
1984	2,547	672	354.00	9.00
1985	2,506	2,272	490.00	42.09
1986	2,944	225	225.00	2.00
1987	1,228	572	93.00	13.00
1988	4,783	1,074	539.00	20.00

FARM SERVICES

The Farm Services section provides support to all programs at ATN&HC. The importance of this unit to all other programs cannot be overemphasized. Equipment was maintained, repaired and renovated and disinfected as required; fields were prepared, maintained and irrigated; a green manure oat crop was grown and plowed down on 14 hectares; chemical fertilizers were applied to 28 hectares; grass was seeded to 6 hectares; caragana were planted to 4 hectares; 625 tonnes of gravel were applied to roadways; 200 tonnes of sand were applied to seed beds; headlands and other grassed in areas were mowed; greenhouse benches were modified and installed; fences, doors, etc. were maintained in good repair; general pruning and cleanup was performed; and 19,600,000 L of irrigation water was applied to production fields.

SUMMARY OF RESEARCH PROJECTS

PROJECTS INITIATED:

1) Evaluation of a *Bacillus* sp as an antagonist to *Pythium* in NFT System.

   Seedless cucumbers grown in NFT were inoculated with *Bacillus* sp, *Pythium*, *Pythium* Truban and a control treatment. Roots will be monitored for *Pythium* development and total yields taken.

2) Evaluation of tomato cultivars in NFT System. Four tomato cultivars are being compared for yield performance.

3) Evaluation of peppers as an economical crop in NFT System. Four pepper cultivars are being compared for yield performance.

4) Effect of growth regulators on fibrous begonias. Two cultivars and 3 growth regulators (Bonzi, Sumagic and Cycocel) are being evaluated.

5) Saskatoon rooting trial (*in vitro*). Standard rooting medium for saskatoons and the effect of charcoal and GAs in this medium on rooting of saskatoon shoots is under investigation.

6) Determination of endogenous levels of hormones during rooting of saskatoon plantlets using HPLC will be investigated.

7) Potato density trial (500 plants/m^2) is under investigation. The effect of CCC and BAP on tuber production in measured.

8) Micropropagation of mongolian cherry selections is being tested in order to find the most suitable medium.

9) Micropropagation of colorado blue spruce will be investigated.

10) Studies on Stem canker and black scurf of potato caused by Rhizoctonia solani. Objectives of the project are to determine anastomosis group affinity and relative pathogenicity of R. solani isolates from Alberta potatoes and devise suitable chemical and/or biological control measures for the disease.

11) Tissue Culture of potatoes. The research project involves the study of the suitability of various media for tissue culture of potatoes.

12) Association of saskatoon roots with fungi. Two fungal species were found colonizing saskatoon roots, identification of these fungi and importance of their association with saskatoon roots is under investigation.

13) Micropropagation pathology of saskatoons. The project involves the development of disease indexing procedures for tissue cultured saskatoons.

14) All America Selections Annual Flower Trial. New cultivars of annual flowers are being judged against the present best ones.

15) Humalite trial on poplar cuttings. Humalite at three rates is being evaluated for effect on hardwood cuttings at rooting and subsequent growth.

16) Humalite trial in containers. Plants in sand in containers are being evaluated for growth with different levels of humalite.

17) Effect of alfalfa pellets on growth of white spruce and Scots pine. Three different levels of alfalfa pellets are being evaluated for effect on growth of conifers as an organic matter supplement.

18) Chemical weed control in Transplanted Lodgepole pine. A cooperative trial with ASCHRC for effectiveness of three herbicides at different rates on Lodgepole pine.

PROJECTS CONTINUING:

1) Observations on Alstromerias as a cut flower under warm temperature.

2) Nutrient study for woody plants. A long term trial to determine the optimum level of soil nutrients on woody plants.

3) Prairie Regional Trial for Woody Ornamentals. A cooperative trial where woody plants are being evaluated for five years. One of seven sites.

4) Plant Introduction Scheme of the University of British Columbia Botanic Gardens. New introductions from UBC are being evaluated for prairie winter hardiness.

5) Regional Woody Plant Test Program Woody plants are being evaluated for hardiness and suitability in seven test sites in Alberta.

6) Vegetable variety trials. The vegetable variety trials consist of the evaluation of various cultural techniques as well as the quality, yield, earliness and market potential of various cultivars of cabbage, broccoli, brussel sprouts, snow peas, cos lettuce, head lettuce, spinach and carrots.

PROJECTS COMPLETE:

1) Seedless cucumber cultivar trial. Cultivars Mustang, Farona, Cargo and PSR 63585 were evaluated for yield performance in an NFT System.

2) Seedless cucumber spacing trial. Cultivars Mustang, Farona and Corona were compared at spacings of 0.8, 0.6 and 0.4 m^2/plant.

3) Tomato cultivar trial. Cultivars Sonatine, Caruso, Laura and B-83-977 were compared for yields in NFT System.

4) Dormancy with saskatoon plantlets. The effect of GAs and BAP on breaking dormancy of newly propagated saskatoon plants was investigated. The combined BAP + GA_3 treatment was most effective. Experiments were done with four cultivars.

5) Micropropagation of Purple leaf birch. WPM medium was found to be the best for initiation and multiplication of cultures. BAP concentration of 1 mg/l was found optimal for multiplication. Rooting was performed on MS medium modified with 2 mg/l of L-Cysteine and 2 mg/l of IBA. Rooting percentage was 99%.

6) Micropropagation of difficult to root geraniums. Cultures were established on MS medium with extra NH_4NO_3. Rooting with difficulties on MS medium. It was found that rooting period has to be extended up to 2 mo to get better results.

7) Sour cherry micropropagation. MS medium was found equally effective to WPM medium for establishing cultures. After multiplication cultures were grown on hormone free medium for elongation. This system was found superior for rooting of shoots. Shoots taken directly from cultures on multiplication were difficult to root. Shoots taken from cultures on elongation medium rooted almost in 100%.

8) Alfalfa pellets as a Nitrogen Source for Turf. Alfalfa pellets were used as a tip dressing to determine if they were a suitable source of nitrogen for turf.

Results showed that alfalfa pellets were not a good fertilizer. Plots were slow to green up and the breakdown of the pellets was extremely slow.

9) Alfalfa pellets as a soil amendment. Evaluation of the effect of alfalfa pellets applied as a soil amendment on vegetables.

The Centre In Photos

Figure 1. July 5, 6 flooding of the Horsehills Creek that runs through the ATN&HC site.

Figure 2. Winter scene at ATN&HC.

Figure 3. Greenhouse production of nuclear seed potatoes.

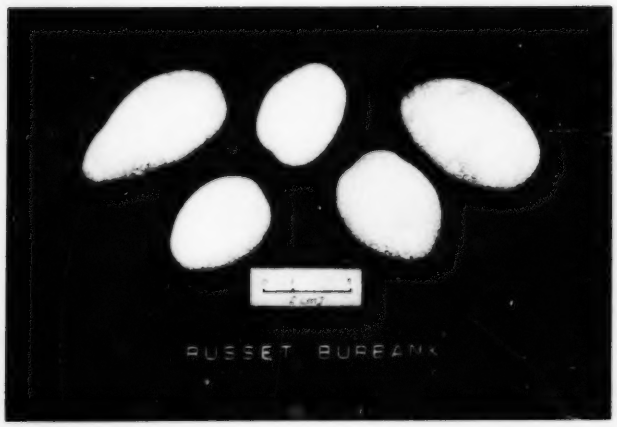

Figure 4. Russet Burbank Nuclear Seed Potatoes.

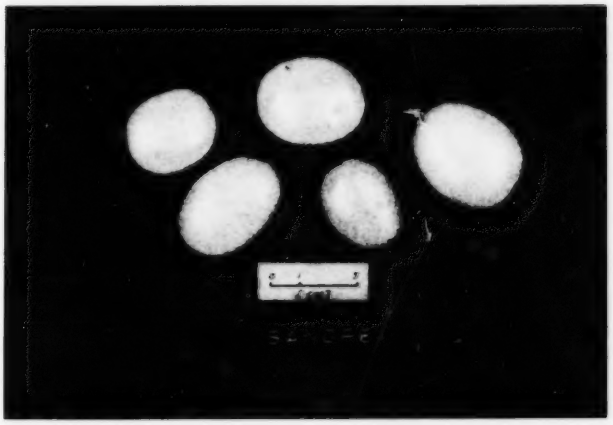

Figure 5. Sangre Nuclear Seed Potatoes.

Figure 6. Sub-division of seed potato and saskatoons under a laminar flow hood.

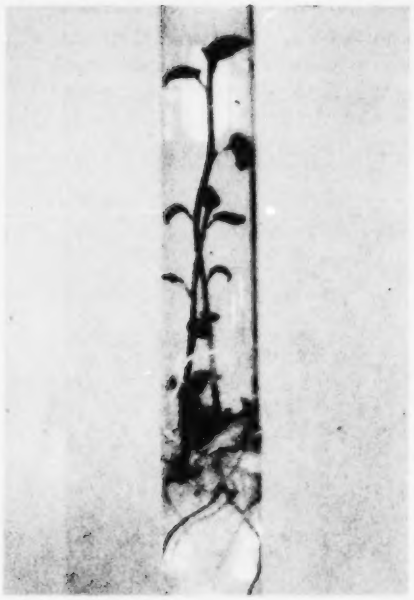

Figure 7. Seed potato (cultivar Russet Burbank) in for production of nodal cuttings.

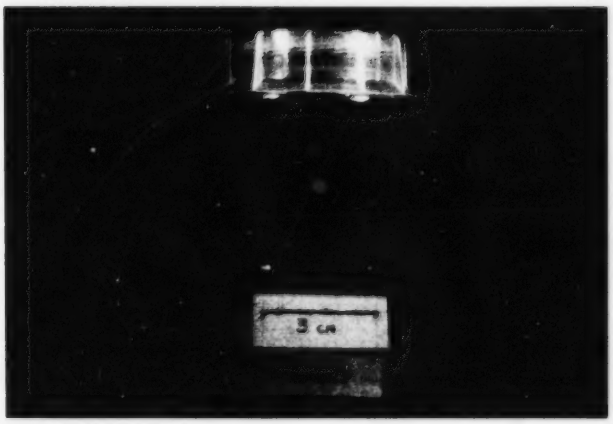

Figure 8. Saskatoon (cultivar Smokey) ready for sub-division.

Figure 9. Broccoli cultivar trial at ATN&HC. Premium Crop was one of the best performing cultivars, having high yields and excellent quality

Figure 10. Broccoli field near Edmonton. Total value of commercially produced broccoli in Alberta in 1988 was $217,000. Of the total 180 acres in commercial broccoli production, 90% were located in central and northern Alberta.

Alberta Tree Nursery & Horticulture Centre Staff - 1988

George Grainger
Senior Manager
/Director

Administration Section

Pat Fowler
Office Manager

Michele Dannish
Branch Secretary

Shelley Draper
Word Processor

Vicki Noel
Courier

Helen Rekrut
Administrative
Secretary

Patsy Fulton
Receptionist

Horticulture Crop Development

James Letal
Head, Horticulture
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Micropropagation
Pathologist

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Dominique Bizon
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Brendan Casement
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Brian Breneman
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Henry Brown
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Container Program

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Seed Section

Doreen Koladich
Seed Section
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Nancy Moroz
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Chemical Section

Doug Lehman
Chemical Applicator

Kevin Thorpe
Gardener

Farm Services

Albert Faulkner
Farm Services
Supervisor

Dave Wearmouth
Farm Services
Foreman

Dave "Steve" Milne
Maintenance
Worker, Irrigation

Bruce Chedzoy
Equipment Operator

Gerhard Dames
Welder

Cyril Cooreman
Field Cultivation

Paul Gervais
Auto Mechanic

Stan Bootsma
Auto Mechanic

Brian Petherbridge
Maintenance
Service Worker